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METHOD AND APPARATUS FOR FLOATING INSTALLATION OF TILES

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RELATED APPLICATIONS

This present application is continuation-in-part of application serial number 10/428,319 filed on April 29, 2003 entitled "METHOD AND APPARATUS FOR FLOATING INSTALLATION OF TILES", by Poliacek et al., currently pending, for which the priority date for this application is hereby claimed and which is incorporated herein by reference in its entirety.

FIELD OF THE INVENTION

This invention relates generally to tile and masonry installation; and specifically to a method and framework for installing tiles of non-traditional shapes.

BACKGROUND OF THE INVENTION

The building industry has long used various types of tiles in construction projects. Tiles come in many forms and are manufactured from various types of materials, in a wide variety of colors and surface textures. For example, ceramic tile is

often used in bathroom applications. Marble tile is often used for flooring and other decorative applications.

Better techniques for installation of tiles have evolved over time. In fact, many patents that describe installation techniques have been granted. Most of these evolutions in tile installation techniques have been developed in response to the inadequacy of former installation methods. One common problem with installation of any tile is the fact that individual tiles need to be aligned relative one to another. In response to this problem, prior art methods for installation of tile include methods where spacers are introducing between individual tiles in order to ensure uniform tile installation.

In fact, all of the known art addresses this major problem. Various techniques for the installation of tile spacers have been devised including the use of a pre-fabricated lattice that can be placed on an installation surface. Once the pre-fabricated lattice is installed, individual tiles may be secured into the lattice resulting in a clean, uniform installation. Of course, all of these prior art methods require the use of a mortar in order to secure an individual tile to the installation surface.

These prior art methods fail to address some other major problems associated with the installation of tile in typical construction applications. One such problem is that of installing tiles exhibiting non-traditional shapes. Other problems not addressed by prior art techniques center around the need to have non-permanent installation of tiles, for example where a tile floor is made part of a display or made part of some other temporary setting.

SUMMARY OF THE INVENTION

Presently disclosed is a method for installing a tile in a floating manner comprising the steps of providing a support within the footprint of a proximate to the outer perimeter of the tile, providing a first border along a first edge of the tile and providing a second border along a second edge of the tile wherein the first edge of the tile and second edge of the tile meet at an angle. According to one alternative method, the position of the first border relative to the second border is maintained. In order to accommodate various non-traditional shaped tiles, the first and second borders are set to meet at an angle that is substantially equal to evaluate the group consisting of 60 degrees, 108 degrees, 120 degrees and 135 degrees.

In order to maintain the position of the first border relative to the second border, one alternative method provides for connecting a first end of the first border to a connecting device and connecting a first and the second border to the connecting device at an angle corresponding to the angle at which the first and second tile edges meet. According to yet another alternative method, connect a first end of the first border to a connecting device comprises attaching a linear groove connector on a first end of the first border to a linear groove connector on a connecting device. Further, the movement to first border relative to the connecting device along the linear groove is restrained.

In accordance with the teachings of the incorporated reference, one alternative method provides for providing a facia between the first border and the second border. According to one alternative method, this is accomplished by providing a border surface in a connecting device used for connecting at the first border to the second border. According to yet another alternative method, this is

accomplished by extending the first border to a tapered transition line and extending the second border to the same tapered transition line.

Also according to the teachings of the integrated reference, providing a support within the footprint of the tile comprises providing a ledge along the first border. According to the teachings presented herein, the ledge is tapered back from the end of the first border at an angle substantially half of the angle between the first border and the second border.

The present invention further comprises an apparatus that implements the teachings of the present method. According to one example embodiment, the apparatus comprises a tile installation fixture comprising a border ledge and a support rail that is collinear with the border and comprises a tapered end. The tile installation fixture, according to one example embodiment, further comprises an end connector. According to one alternative embodiment, the end connector comprises a linear groove connector. According to yet another alternative embodiment, the linear groove connector includes a later restraint means.

According to one alternative embodiment, the tapered end is angled back from the end of the border edge . The angle is provided to accommodate the installation of a second tile installation fixture at an angle relative to a first installation fixture wherein the angle between the two installation fixtures is selected from a group of angles consisting of 60 degrees, 108 degrees, 120 degrees and 135 degrees. According to one alternative embodiment, the tapering back of the tapered end is at an angle substantially equal to one-half of the angle at which a first and second tile installation fixture are installed (relative to each other).

According to yet another embodiment, the installation fixture of the present invention further comprises an expansion relief cut into its bottom.

The present invention is further embodied in a connector device used to connection two tile installation fixtures to each other at an angle. According to one example embodiment, a tile connecting device comprises a first tile installation fixture connector and a second tile installation fixture connector set at an angle relative to the first tile installation fixture. According to one alternative embodiment, the second tile installation connector is set relative to the first tile installation connector substantially at an angle of one of the group consisting of 60 degrees, 108 degrees, 120 degrees and 135 degrees.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing aspects are better understood from the following detailed description of one embodiment of the invention with reference to the drawings, in which:

Fig. 1 is a flow diagram that depicts one example method for floating installation of tile where the tile is of a non-traditional shape;

Fig. 1A is a pictorial diagram that depicts various non-traditional tile shapes;

Fig. 2 is a flow diagram that depicts a method for selecting the angle at which a first tile border and a second tile border meet;

Fig. 3 is a flow diagram that depicts one alternative method for maintaining the position of the first border relative second border;

Fig. 4 is a flow diagram that depicts one example method for connecting a first end of the first border to a connecting device;

Fig. 5 is a pictorial diagram that depicts installation of triangularly shaped tiles according to the method of the present invention;

Fig. 6 is a perspective diagram of a lattice of tile receptacles capable of accepting equilateral triangularly shaped tiles;

Fig. 6A is a perspective diagram that depicts a connecting device 105 is capable of connecting tile installation fixtures meeting at an angle of substantially 60 degrees;

Fig. 7 is a perspective diagram of a tile receptacle capable of accepting a hexagonally shaped tile;

Fig. 7A is a perspective diagram of a connecting device capable of maintaining the angle between a first and second border at substantially 120 degrees;

Fig. 8 is a pictorial diagram that illustrates the geometry associated with the creation of a lattice of tile receptacles capable of accepting hexagonally shaped tiles;

Fig. 9 to pictorial diagram that illustrates the geometry associated with the creation of a lattice of tile receptacles cable of accepting octagonally shaped tiles;

Fig. 10 is a perspective diagram that illustrates one example embodiment of a lateral restraint means;

Fig. 11 is a perspective diagram that illustrates one example embodiment of a tile installation fixture; and

Fig. 12 is a perspective diagram that presents an alternative view of the tile installation fixture.

DETAILED DESCRIPTION OF THE INVENTION

Applicant has described in the parent application to this continuation a method and apparatus for installing tiles in a manner where the tiles float above a substrate. All though these teachings provide adequate guidance for installing tile that is traditionally shaped tile, i.e. a square, additional teaching is provided herein for the installation of tiles that take on other non-traditional shapes. Such non-traditional tile shapes include, but are not limited to pentagonal shaped tiles, hexagonally shaped tiles and octagonally shaped tiles. With this teaching, it becomes clear that installation of a tile work could be more decorative when non-traditional shapes could be installed. All of the advantages provided by the teachings of the incorporated reference are retained with the teachings provided herein for the installation of non-traditional shaped tile.

Fig. 1 is a flow diagram that depicts one example method for floating installation of tile where the tile is of a non-traditional shape. According to this example method, a support is provided within the footprint of the tile substantially proximate to the outer perimeter thereof (step 5). A border is provided along a first edge of the tile (step 10). A second border is provided along a second edge of the tile (step 15) at an angle substantially equal to the angle at which the first and second edges of the tile meet. According to one alternative example method, floating installation of tile further provides for maintenance of the position of the first border relative to the second border (step 17).

Fig. 1A is a pictorial diagram that depicts various non-traditional tile shapes. With various shapes of tiles, the angle at which the first border and the second border meet is generally made equal to the angle at which the first and second edges of the tile meet. For example, where a tile is triangularly shaped (22) (e.g.

an equal lateral triangle) a first and second edge of the tile meet at 60 degrees (23). Hence, the first and second borders are set to meet at 60 degrees. Where a tile is shaped as a pentagon (27), the first and second borders are set to meet at approximately 108 degrees (28). According to one to variation of the present method, the hexagonally shaped tile (31) may be installed by setting the first and second borders to meet at an angle of 120 degrees (32). According to yet another variation in the present method, an octagonally shaped tile (33) is installed by setting the first and second borders to meet at an angle of 135 degrees (34).

Fig. 2 is a flow diagram that depicts a method for selecting the angle at which a first tile border and a second tile border meet. According to one alternative variation of the present method, maintenance of the position of the first border relative to a second border (step 20) is accomplished by selecting an angle from the group consisting of 60 degrees (25), 108 degrees (30), 120 degrees (35) and 135 degrees (45).

Fig. 3 is a flow diagram that depicts one alternative method for maintaining the position of the first border relative second border. According to this alternative method, a first end of the first border is connected to a connecting device (step 50). A first end of the second border is connected to the same connecting device (55).

Fig. 4 is a flow diagram that depicts one example method for connecting a first end of the first border to a connecting device. According to this example method, connecting a first end of the first border to a connecting device comprises attaching a linear groove connector on a first end of the first border to a linear groove connector on a connecting device (step 60). According to one alternative

method, the position of the first border relative to the connecting device is restrained from moving along the linear grooves (step 65). According to yet another alternative method, expansion relief is provided underneath the connecting device (step 70) where the connecting device is made of a porous material that may expand with humidity or other exposure to moisture.

Fig. 1 further illustrates that one alternative method of the present invention for installing tiles in a floating manner further comprises providing a facia between the first and second borders (set 19). According to one alternative method, this is accomplished by providing a border surface in a connecting device used to connect the first border to second border. According to one alternative method, this is accomplished by extending the first border to a tapered transition line and extending the second border to the tapered transition line.

Commensurate with the teachings of the incorporated reference, providing a support within the footprint of the tile comprises, according to one alternative method, providing a ledge along the first border. In order to support non-orthogonal meeting angles between a first border and a second border, the ledge along the first border may be tapered back from the first border at an angle substantially equal to half of the angle between the first border and a second border in a particular installation.

According to yet another alternative method, as shown in Fig. 1, floating installation of tiles further provides for an expansion relief under the first border (step 12). This expansion relief may be provided where the first and second border are fabricated of a porous material that is subject to distortion as result of environmental effects such as moisture and heat.

Fig. 5 is a pictorial diagram that depicts installation of triangularly shaped tiles according to the method of the present invention. According to this example embodiment, a first tile installation fixture 100 is attached to a connecting device 105. A second tile installation fixture 110 is attached to the same connecting device 105 at an angle substantially equal to 60 degrees to accommodate the installation of tiles having an equilateral triangular shape. Such a matrix of connecting devices and tile installation fixtures may be used to form a lattice of tile receptacles capable of receiving such equilateral triangularly shaped tiles.

Fig. 6 is a perspective diagram of a lattice of tile receptacles capable of accepting equilateral triangularly shaped tiles. As can be seen in this figure, a tile installation fixture 115 comprises a support rail 120 this collinear with a border 125 also included in the tile installation fixture 115.

Fig. 6A is a perspective diagram that depicts a connecting device 105 is capable of connecting tile installation fixtures meeting at an angle of substantially 60 degrees. According to this embodiment, a connecting device comprises six individual tile installation fixture connectors uniformly rotated about a center-point 140. The angle between two adjacent connectors is substantially equal to 120 degrees (145). According to one alternative embodiment, the connecting device 105 comprises a linear groove connector 142. According to yet another alternative embodiment, the connecting device 105 further comprises an expansion relief 147 on its bottom surface. According to yet another alternative embodiment, the connecting device 105 comprises a border surface 149 disposed in the region between the tile installation fixture connectors 142.

Fig. 7 is a perspective diagram of a tile receptacle capable of accepting a hexagonally shaped tile. According to this example embodiment, a first tile

installation fixture 150 meets a second tile installation feature 155 at an angle substantially equal to 120 degrees (160). According to this example embodiment, a uniform lattice of tile receptacles can be formed by using a connecting device 170 wherein a first connector and a second connector included in the connecting device 170 percent at an angle of 60 degrees (165).

Fig. 7A is a perspective diagram of a connecting device capable of maintaining the angle between a first and second border at substantially 120 degrees. According to this embodiment, a connecting device comprises three tile installation fixture connectors equally rotated about a center point 175. Hence, the angle between the three tile installation fixtures is substantially equal to 60 degrees (177). According to one example embodiment, the tile installation fixture connector comprises a linear groove connector 180. According to yet another example embodiment, expansion relief 185 is also included at the bottom surface of the connecting device 170.

Fig. 8 is a pictorial diagram that illustrates the geometry associated with the creation of a lattice of tile receptacles capable of accepting hexagonally shaped tiles. According to this example embodiment, a hexagonally shaped tile 200 is provided with a border region 205 between tiles. Accordingly, additional border is provided at the intersection 210 of three tiles. Hence, upon study of the drawing, it becomes apparent that the two connectors on a connecting device are set substantially at 60 degrees 215 with respect to each other.

Fig. 9 to pictorial diagram that illustrates the geometry associated with the creation of a lattice of tile receptacles cable of accepting octagonally shaped tiles. According to this example embodiment, four octagonally shaped tiles 220 are arranged in a substantially orthogonal cluster. Accordingly, border regions

225 are provided between the tiles. The resulting cluster generally leaves a large gap between the tiles. According to this example embodiment, a square tile 230 is disposed in the large gap. This example embodiment illustrates how the method of the present invention can be used to form various patterns of non-traditionally shaped tiles. This example embodiment also illustrates how non-traditionally shaped tiles can be used with traditionally shaped (e.g. square tiles) to form a wide assortment of installation patterns. This example embodiment also illustrates that a single connecting device may have connectors is set at different angles. For example, the geometry depicted in Fig. 9 requires a connecting device including three connectors and that the angle between two connectors should be set to 57.354 degrees (250) resulting in a non-equilateral triangular shape for the connecting device. The remaining two internal angels of the connecting device of this alternative embodiment are set to 61.323 degrees (255).

Fig. 10 is a perspective diagram that illustrates one example embodiment of a lateral restraint means. According to this example embodiment, a connecting device 275 comprises a linear groove connector 280. When a complementary linear groove connector (e.g. a connector on one end of a tile installation fixture) is made with a linear groove connector 280, lateral displacement 290 may occur along the linear grooves. In order to prevent this, one example by net of a connecting device 275 further comprises a restraint means 300. According to one example embodiment, the restraint means comprises a prong that the protrudes outward from the connecting device 275, and generally extending outward from the base 305 of the connecting device 275.

Fig. 11 is a perspective diagram that illustrates one example embodiment of a tile installation fixture. According to this example embodiment, a tile installation

fixture 320 comprises a border ledge 325 and a support rail 330 this collinear with the border ledge 325. According to this example embodiment, the support rail 330 is tapered back by an angle 340. This tapering angle is selected in order to accommodate detachment of a second tile installation fixture wherein a first end of a first tile installation fixture and a first end of a second tile installation fixture are attached to a connecting device and wherein the first and second tile installation fixtures need to the connecting device at an angle substantially equal to one of the group consisting of 60 degrees, 108 degrees, 120 degrees and 135 degrees. Typically, this tapering angle is set to one half of the angle at which the first and second tile installation fixtures meet. According to one alternative example embodiment, the tile installation feature 320 further comprises a linear groove end connector 350. According to yet another alternative example embodiment, the tile insulation feature 320 further comprises an expansion relief 355 cut into the bottom surface of the tile insulation fixture 320.

Fig. 12 is a perspective diagram that presents an alternative view of the tile installation fixture. This figure illustrates that the tile installation fixture 320, according to one alternative embodiment of, further comprises an expansion relief 335 transverse to the fixture 335. According to yet another alternative embodiment, an expansion relief 365 cut lengthwise into the bottom surface 360 is also included in the tile installation fixture 320. It should be noted, that according to one alternative embodiment, the lengthwise expansion relief 365 also serves as a lateral restraint means to prevent the linear groove connector 350 from sliding along in the groove of a corresponding connector included in a connecting device. According to one example embodiment, the prong 300 protruding outward at the base of the connecting device is set within the lengthwise expansion relief 365 as the linear groove connector 350 comprising

the tile insulation feature 320 is mated with a corresponding connector included in the connecting device.

Alternative Embodiments

While this invention has been described in terms of several preferred embodiments, it is contemplated that alternatives, modifications, permutations, and equivalents thereof will become apparent to those skilled in the art upon a reading of the specification and study of the drawings. It is therefore intended that the true spirit and scope of the present invention include all such alternatives, modifications, permutations, and equivalents.